Value of Embedded Training -

Future Combat Systems Example

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Agenda

- Introduction and Purpose.
- Background:
  - Definitions of Embedded Training (ET).
  - Training and Embedded Training Metrics
  - Future Combat Systems (FCS) Training Concept.
- ET Concept is Not Uniform: Training Anywhere, Anytime.
- ET and ARFORGEN/Modular Brigades – Different Paradigm for Army.
- ET – Valuing ET Requires New Thinking
- Way Ahead.

Army Embedded Training

Introduction

Embedded training is the Army's required option of training for the FCS at the Soldier, leader, and unit levels. It has been included as a required capability in the Future Combat Systems.

Purpose

To develop an analytic approach to determine the value of embedded training as it is introduced in the FCS System of Systems (SoS). *Propose the idea of training as a consumable and postulate some metrics for cost value estimates.*

Background: Embedded Training - Definitions

- **Department of Defense**

  Embedded Training. Capabilities built into, strapped onto, or plugged into operational materiel systems to train, sustain, and enhance individual and crew skill proficiencies necessary to operate and maintain the equipment.

- **US Army:**
  - "A function hosted in hardware and/or software, integrated into the overall equipment configuration. Embedded training supports training, assessment, and control of exercises on the operational equipment, with auxiliary equipment and data sources, as necessary. Embedded training, when activated, starts a training session, or overlays the system's normal operational mode, to enter a training and assessment mode."

  .
- **US Navy:**
  - "Training that is provided by capabilities built into or added onto operational systems, subsystems, or equipment, to enhance and maintain the skill proficiency of fleet personnel."
- **US Air Force:**
  - "A training capability which is designed into or added onto operational equipment."

Embedded Training…..

a DoD plan ; an Army Commitment

"Build an Integrated Live, Virtual, and Constructive Training Environment. The ultimate goal is to develop a transformed training capability that provides accurate, timely, relevant, and affordable training and mission rehearsal in support of specific operational needs. Training must be a living process with the ability to adapt and respond quickly to the dynamic challenges of the national security environment. This will require the ability to identify potential crisis situations in real time; conduct course-of-action analyses; utilize continuously available networks for mission rehearsal, simulation and just-in-time training; and measure performance systematically to improve operational effectiveness."

Expanded training capabilities to enable training anywhere, anytime

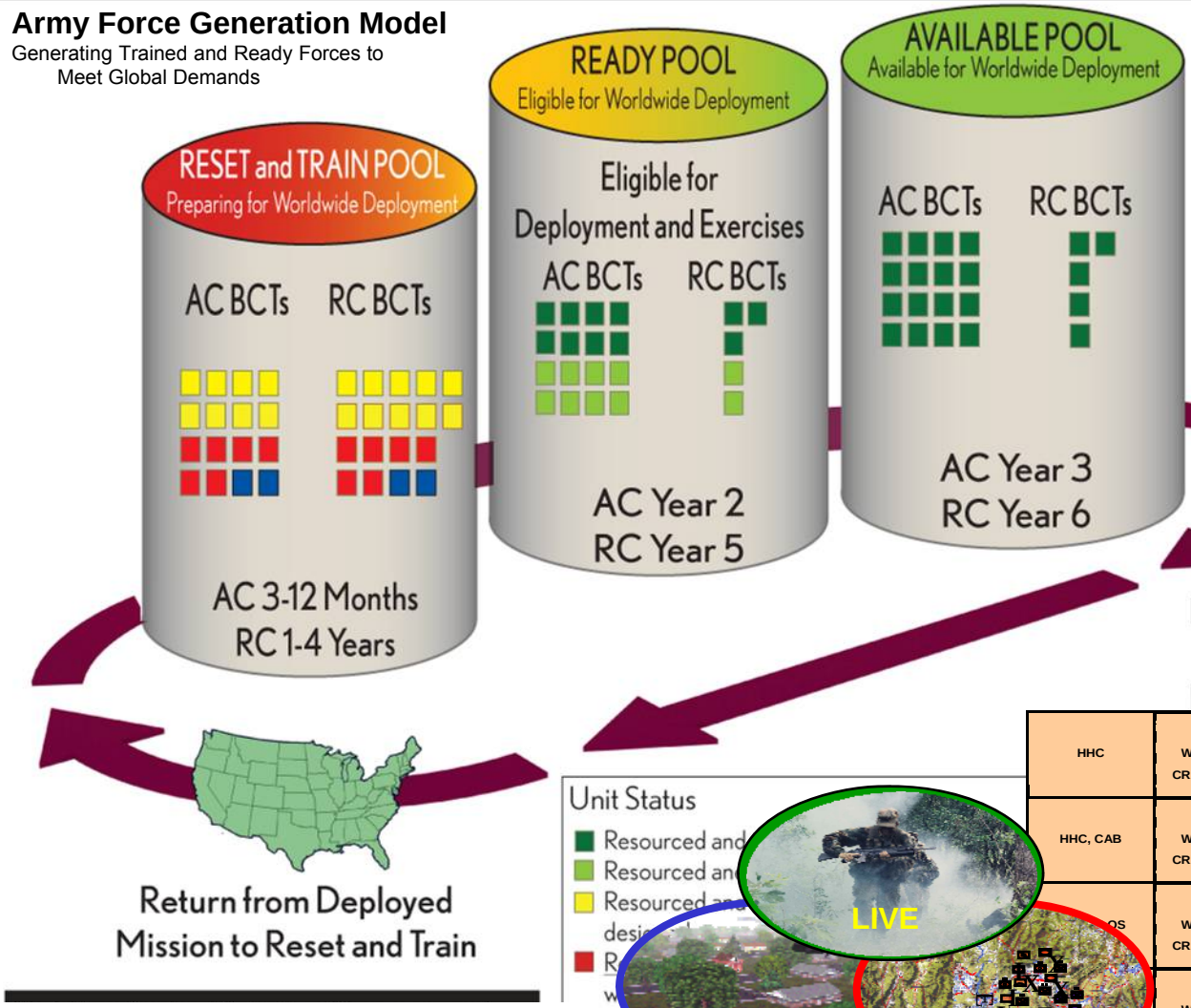
Training Enhancements Current Force vs Future Force

Current Force	FCS Equipped BCT
Infrequent doctrine/TTP updates	Ability to rapidly update doctrine/TTP for deployed forces
Slow to adapt to needed changes	Respond quickly to the dynamic challenge
Constrained training capability when deployed	Ability to train 24/7 with no appended equipment while deployed or at Home Station
Appended TESS	Embedded TESS capability
Limited training support packages	Fully embedded Live, Virtual, Constructive, Multi-mode training capability
Limited Battle Command Training Capability	Embedded Battle Command Training capability
Custom SW for each application	- Product line approach to system development - Collective training capability - Basic load of Training Support Packages

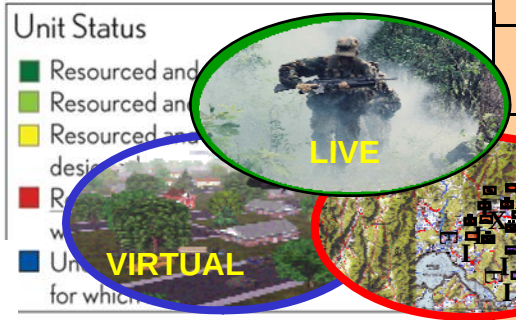
FCS is providing a new capability that takes Training to the Soldier anywhere, anytime

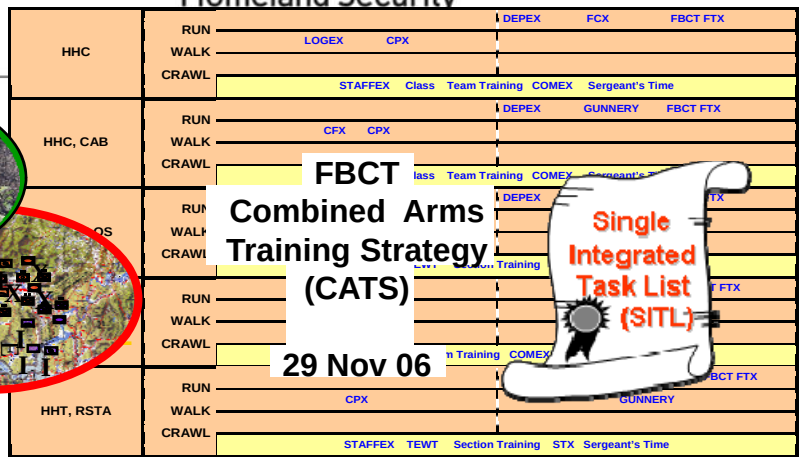
Training in Context of ARFORGEN

Army Force Generation Model
Generating Trained and Ready Forces to Meet Global Demands



FCS Embedded Training enables the ARFORGEN concept before and during deployment





FBCT Combined Arms Training Strategy (CATS)

29 Nov 06

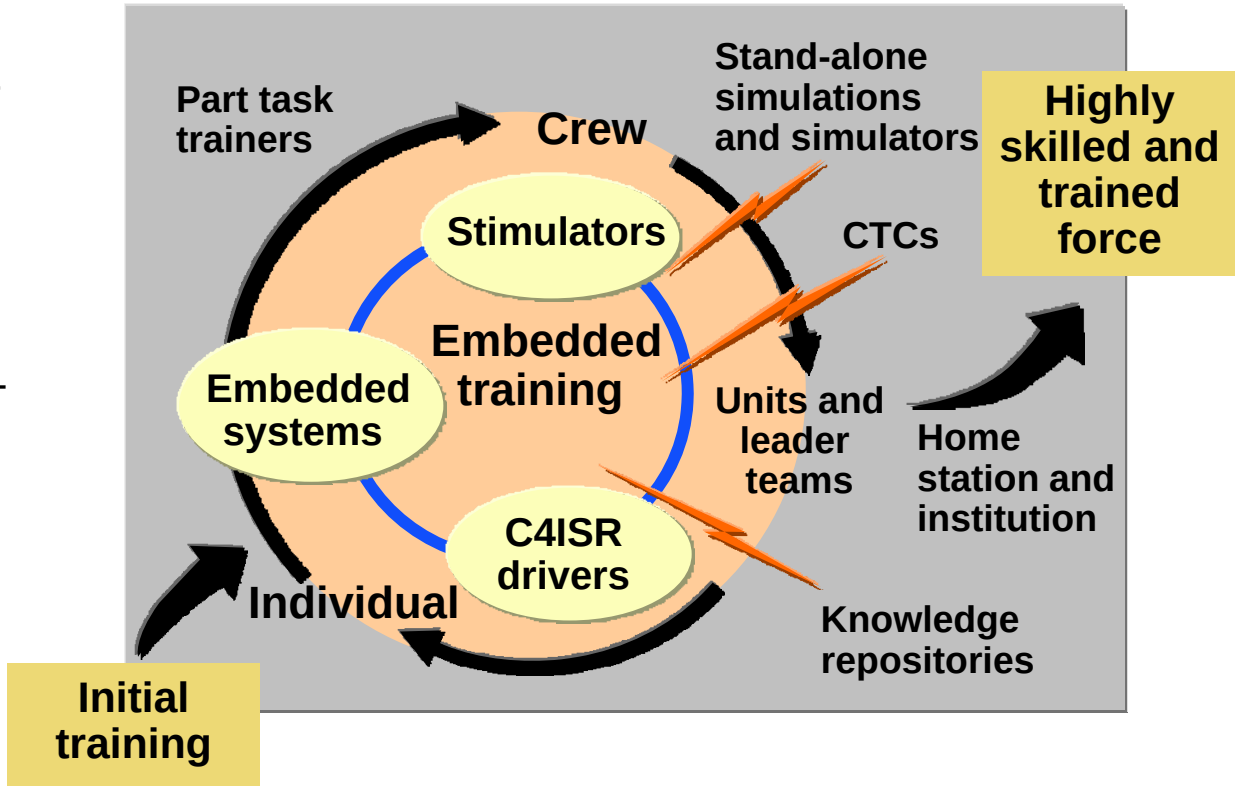
Single Integrated Task List (SITL)

ARFORGEN

Approved for Public Release, Distribution Unlimited, PM FCS 6 MAY 2008, case 08-059.

Background: FCS BCT Training Concept

- Expanded training availability using organic, integrated, embedded systems - Training, Operations, and Mission Planning/Rehearsal - for full spectrum training including Joint, Interagency, and Multinational (JIM).
- Full range of training task representation - individual, crew, collective, and leaders - embedded or 'reach' via C4ISR system.
- Reduced training burden and cost resulting from product line design approach - maximum commonality between operational and training systems.



FCS will provide the first Army embedded training capability that supports individual, crew, collective, unit, and leader training.

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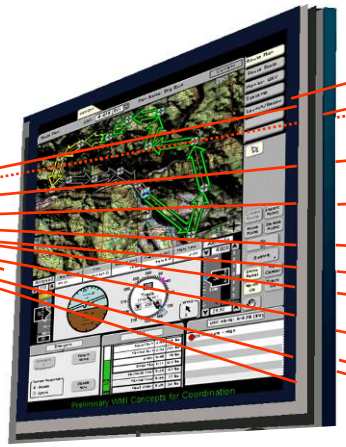
Role Based Command and Control & Training

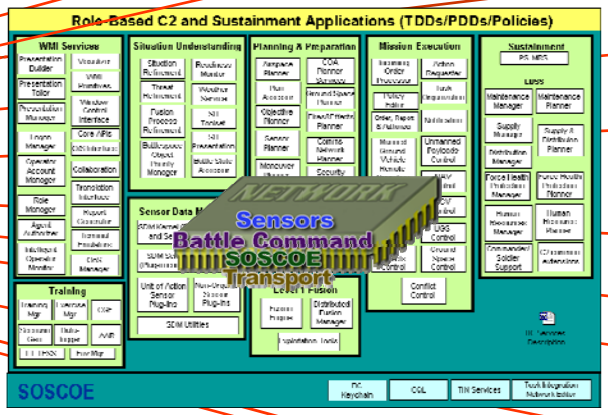
Training is an integral part of the operational system

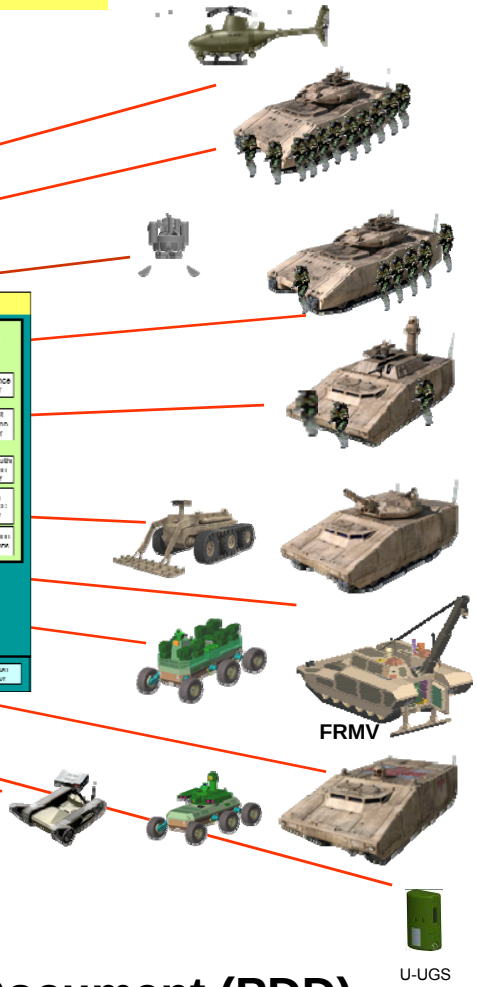
OPERATIONAL ROLE

WMIS (GDTA / PDDs)

BCS (TDDs)







Operational Roles

Goal Directed Task Analyses (GDTAs)

WMI specifications

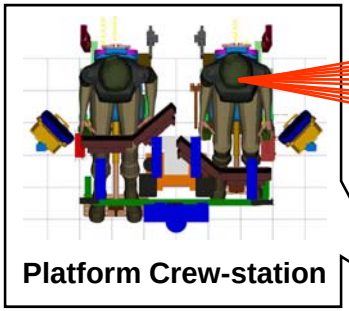
Presentation Description Document (PDD)

TIN Description Document (TDD)

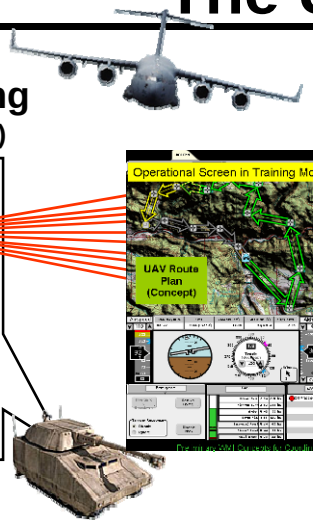
Integrated Software

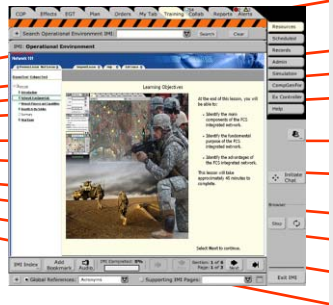
FCS Embedded Training
The User Requirement for FCS

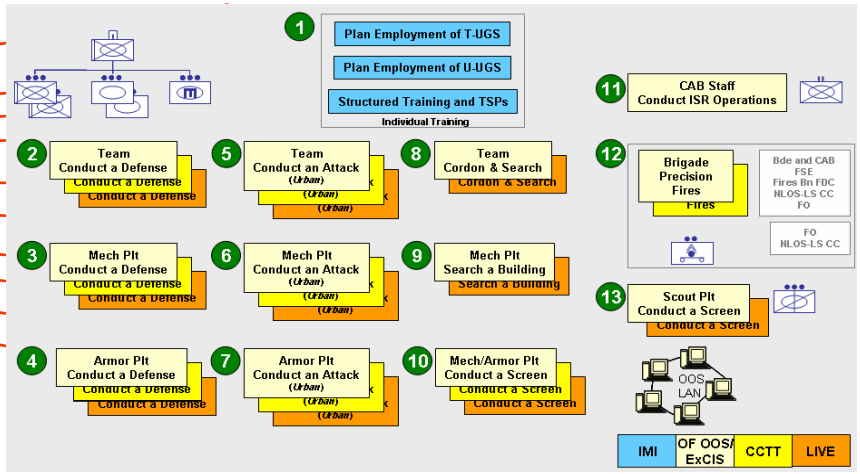
Embedded Training
(Crews and Soldier)



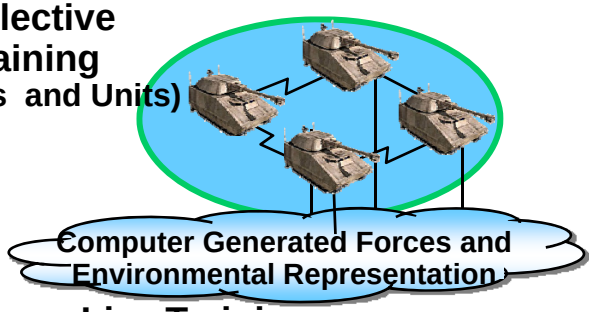
Platform Crew-station



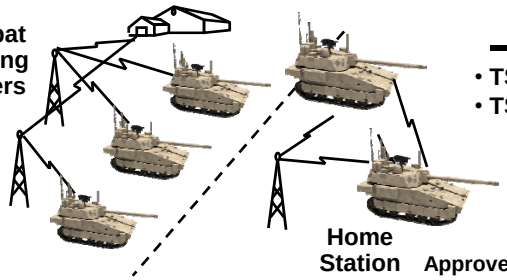




Distributed, Collective Training
(Leaders and Units)



Live Training
(Embedded Tactical Engagement Simulation System (TESS) and CTC Instrumentation Interface)



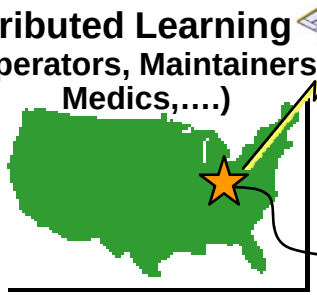
On-board TSP Catalogue

- TSP in Catalogue
- TSP On-board

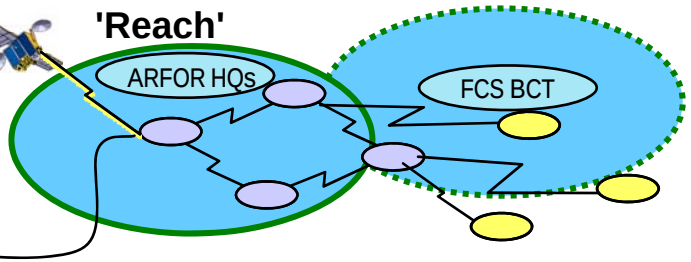
FCS BCT

- Ability to rapidly update doctrine/TTP/Training for deployed forces
- Training accessible 24/7with no appended equipment – readiness is enhanced
- Embedded instrumentation permanently affixed and configured concurrent with design changes
- Embedded Live, Virtual, Constructive, Multi-mode training capability
- Embedded Training access to Battle Command for realistic representation
- Realistic training on operational equipment – anywhere - anytime
- Eliminates separate development of part task simulations

Distributed Learning
(Operators, Maintainers, Medics,….)

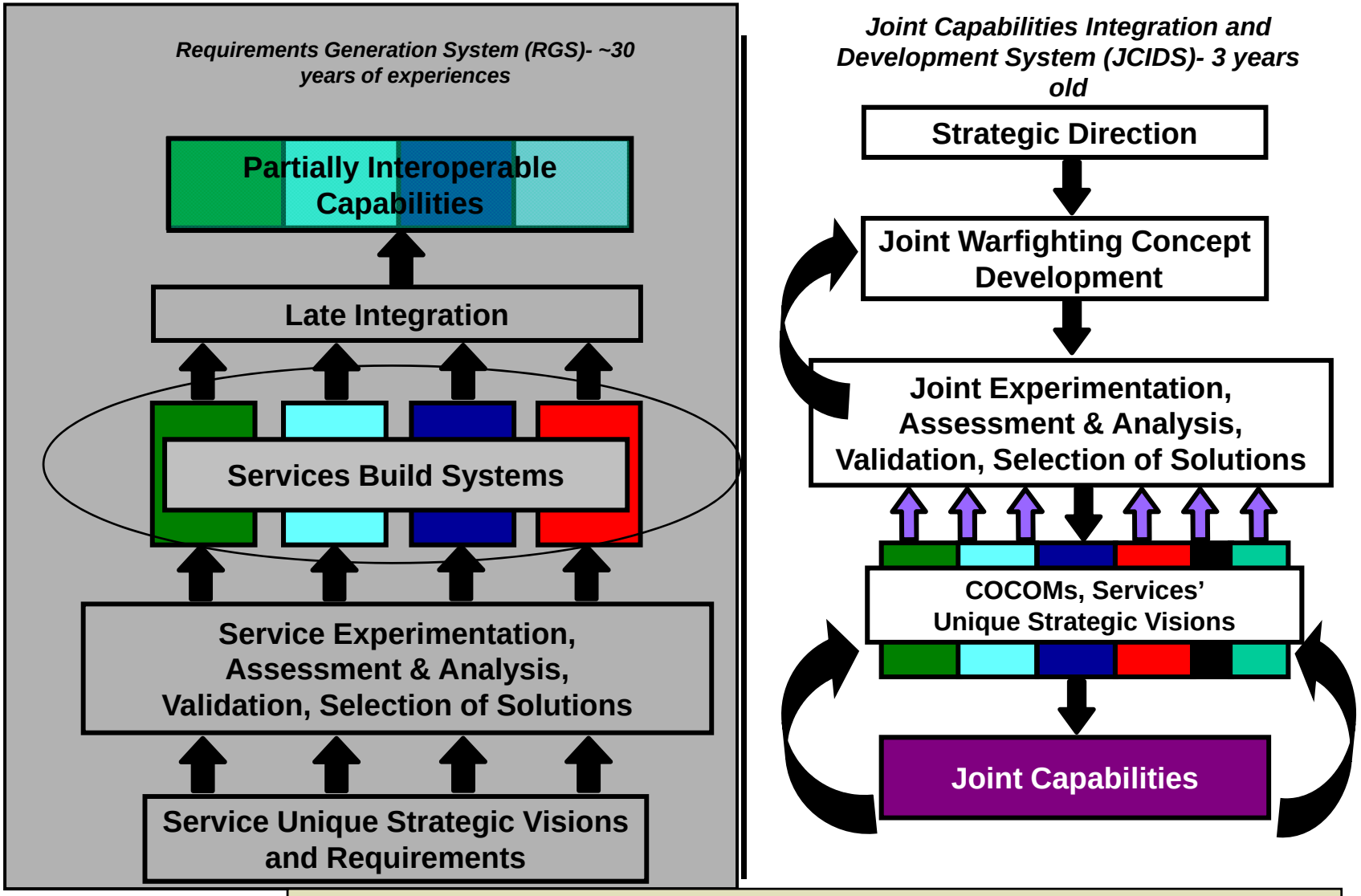


'Reach'



FCS BCT will be capable of "reach" for training products (e.g., TSPs).

The World has Changed - Threat vs. Capability Based Planning

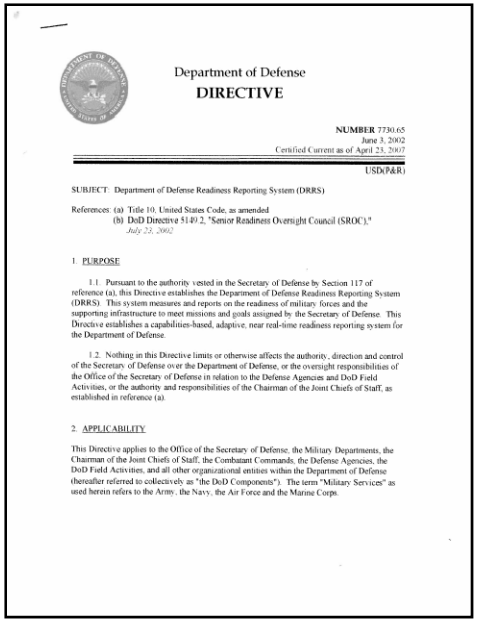


FCS Embedded Training Inseparable from Battle Command

Value of Embedded Training and Application to Operational Environment

KEY DOCUMENTS to TRAINING Situational Awareness

Joint Staff/OSD



Department of Defense
DIRECTIVE

NUMBER 7730.65
June 3, 2002
Certified Current as of April 23, 2007

USD(P&R)

SUBJECT: Department of Defense Readiness Reporting System (DRRS)

References: (a) Title 10, United States Code, as amended
(b) DoD Directive 5149.2, "Senior Readiness Oversight Council (SROC)," July 23, 2002

1. PURPOSE

1.1. Pursuant to the authority vested in the Secretary of Defense by Section 117 of reference (a), this Directive establishes the Department of Defense Readiness Reporting System (DRRS). This system measures and reports on the readiness of military forces and the supporting infrastructure to meet missions and goals assigned by the Secretary of Defense. This Directive establishes a capabilities-based, adaptive, near real-time readiness reporting system for the Department of Defense.

1.2. Nothing in this Directive limits or otherwise affects the authority, direction and control of the Secretary of Defense over the Department of Defense, or the oversight responsibilities of the Office of the Secretary of Defense in relation to the Defense Agencies and DoD Field Activities, or the authority and responsibilities of the Chairman of the Joint Chiefs of Staff, as established in reference (a).

2. APPLICABILITY

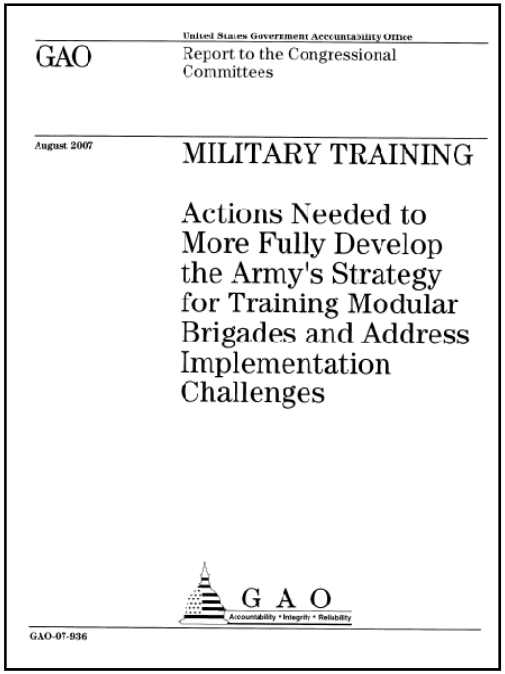
This Directive applies to the Office of the Secretary of Defense, the Military Departments, the Chairman of the Joint Chiefs of Staff, the Combatant Commands, the Defense Agencies, the DoD Field Activities, and all other organizational entities within the Department of Defense (hereafter referred to collectively as "the DoD Components"). The term "Military Services" as used herein refers to the Army, the Navy, the Air Force and the Marine Corps.

DoD Directive
…capabilities-based, adaptive, near real-time readiness reporting system..

…Senior Readiness Oversight Council… Joint Quarterly Readiness Review..
…identify critical readiness deficiencies, and develop strategies for rectifying these deficiencies…
… **metrics to measure readiness to execute essential tasks.**

GAO Rp
…"goals to guide training not mandatory
… **Army training strategy lacks metrics**
…Army relies on professional assessment
…new collective training metrics ..FY 08
…Army's training strategy …support ARFORGEN
…ARFORGEN..Reset/Train..READY…AVAILABLE

GAO Mandated Analysis



United States Government Accountability Office
GAO
Report to the Congressional Committees

August 2007

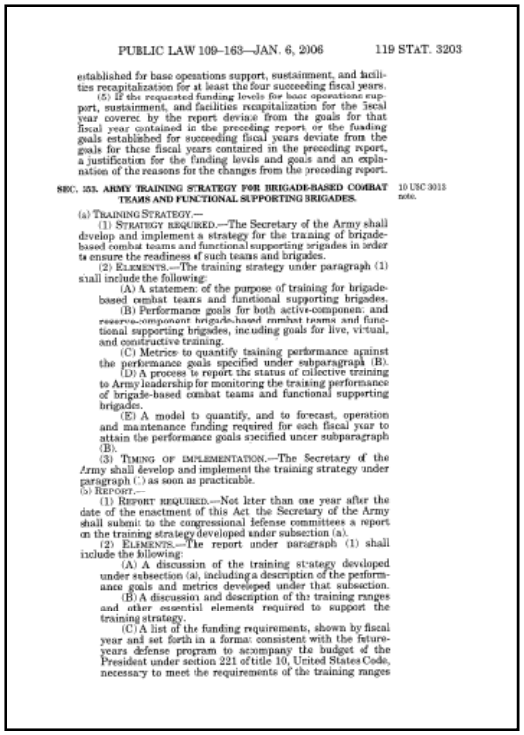
MILITARY TRAINING

Actions Needed to More Fully Develop the Army's Strategy for Training Modular Brigades and Address Implementation Challenges

GAO
Accountability • Integrity • Reliability

GAO-07-936

Congress



PUBLIC LAW 109–163—JAN. 6, 2006 119 STAT. 3203

established for base operations support, sustainment, and facilities recapitalization for at least the four succeeding fiscal years.
(5) If the requested funding levels for base operations support, sustainment, and facilities recapitalization for the fiscal year covered by the report deviate from the goals for that fiscal year contained in the preceding report or the funding goals established for succeeding fiscal years deviate from the goals for those fiscal years contained in the preceding report, a justification for the funding levels and goals and an explanation of the reasons for the changes from the preceding report.

SEC. 353. ARMY TRAINING STRATEGY FOR BRIGADE-BASED COMBAT TEAMS AND FUNCTIONAL SUPPORTING BRIGADES. 10 USC 3013 note.

(a) TRAINING STRATEGY.—
(1) STRATEGY REQUIRED.—The Secretary of the Army shall develop and implement a strategy for the training of brigade-based combat teams and functional supporting brigades in order to ensure the readiness of such teams and brigades.
(2) ELEMENTS.—The training strategy under paragraph (1) shall include the following:
(A) A statement of the purpose of training for brigade-based combat teams and functional supporting brigades.
(B) Performance goals for both active-component and reserve-component brigade-based combat teams and functional supporting brigades, including goals for live, virtual, and constructive training.
(C) Metrics to quantify training performance against the performance goals specified under subparagraph (B).
(D) A process to report the status of collective training to Army leadership for monitoring the training performance of brigade-based combat teams and functional supporting brigades.
(E) A model to quantify, and to forecast, operation and maintenance funding required for each fiscal year to attain the performance goals specified under subparagraph (B).
(3) TIMING OF IMPLEMENTATION.—The Secretary of the Army shall develop and implement the training strategy under paragraph (1) as soon as practicable.
(b) REPORT.—
(1) REPORT REQUIRED.—Not later than one year after the date of the enactment of this Act, the Secretary of the Army shall submit to the congressional defense committees a report on the training strategy developed under subsection (a).
(2) ELEMENTS.—The report under paragraph (1) shall include the following:
(A) A discussion of the training strategy developed under subsection (a), including a description of the performance goals and metrics developed under that subsection.
(B) A discussion and description of the training ranges and other essential elements required to support the training strategy.
(C) A list of the funding requirements, shown by fiscal year and set forth in a format consistent with the future-years defense program to accompany the budget of the President under section 221 of title 10, United States Code, necessary to meet the requirements of the training ranges

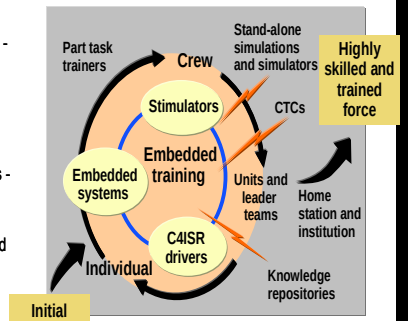
"Metrics to **quantify training performance**"…
"Performance goals for training
…live, virtual, and constructive training"
" A model to quantify, and **forecast O&M funding** to obtain performance goals…

Back

Army, Navy, USAF Approaches to Training

Army

- Expanded training availability using organic, integrated, embedded systems - Training, Operations, and Mission Planning/Rehearsal - for full spectrum training including Joint, Interagency, and Multinational (JIM).
- Full range of training task representation - individual, crew, collective, and leaders - embedded or 'reach' via C4ISR system.
- Reduced training burden and cost resulting from product line design approach - maximum commonality between operational and training systems.



FCS will provide the first Army embedded training capability that supports individual, crew, collective, unit, and leader training.

Navy

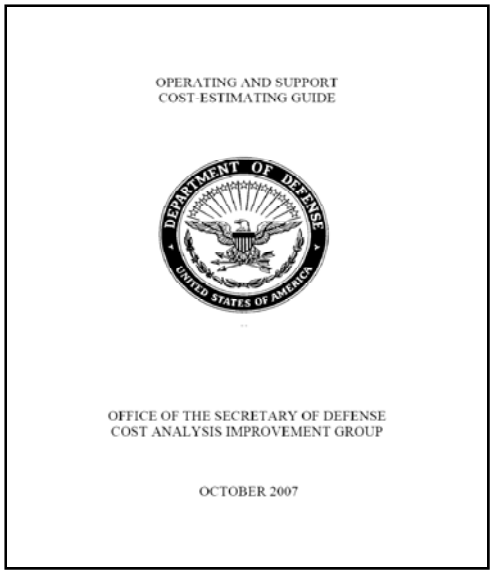
Blurring of Lines Between Training and Operations

- Navy is moving toward virtual simulation to certify proficiency and mission readiness.
  - Battle Force Training Tool (BFTT):
    - Each unit is provided the scenario, using Wide Area Network (WAN).
    - Each unit joins a Synthetic Theater of War (STOW) at the gaming area.
      - Training accomplished in-port, but interacts as if underway in the STOW.
    - Scenarios may be transmitted from a land-based site.
    - Battle Force/Group Commanders participate.
  - Allows participation from various unit types.
  - Utilizes Wide Area Training Network that is independent of tactical data links.

3 April 2006 9

Air Force

Army, Navy, and USAF have different cultures of training. Simulations have fostered joint training. Readiness metrics must leverage simulations. The cost benefit of Embedded Training and Simulations in current LCCE needs modification.


OPERATING AND SUPPORT COST-ESTIMATING GUIDE

OFFICE OF THE SECRETARY OF DEFENSE
COST ANALYSIS IMPROVEMENT GROUP

OCTOBER 2007

Embedded Training and Readiness

VALUE of
TRAINING is aligned with READINESS

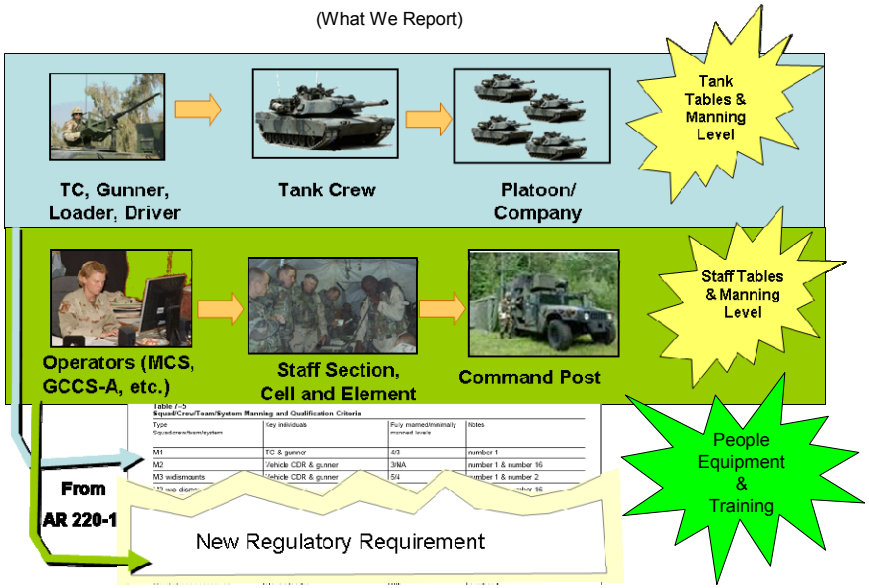
- ***Readiness = TRAINING + People + Equipment***

- ***DoD, Joint, Army & Other Services are moving toward "better" readiness/training metrics…what will they look like? See Joint Criteria… and correlation to timeliness?***

- ***Business case for training value – Old – SAVE FUEL & O&M…still some validity…Newer – Availability, Adaptability, Realism, Efficiency….***

- ***Business case…Learning, Forgetting, Relearning curve will impact "business calculus" for training systems. How often and at what cost for 'training readiness'?***

Battle Command as Weapon System



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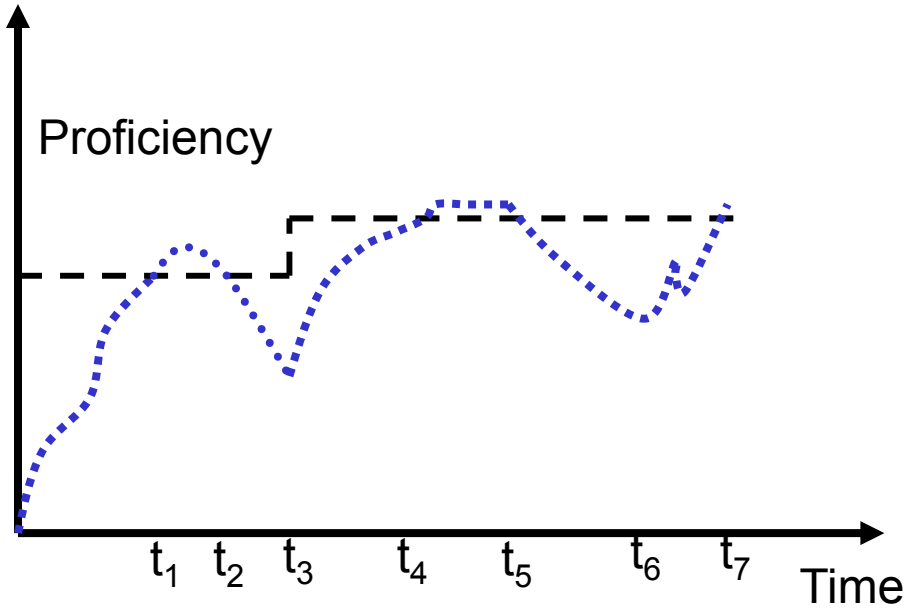
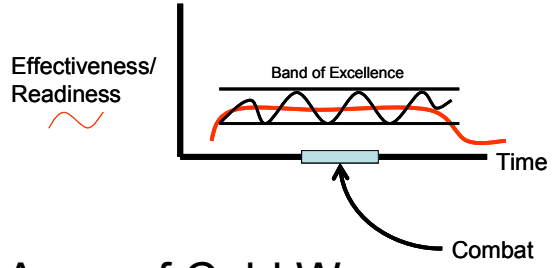
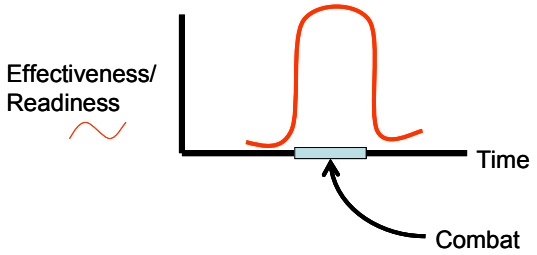
Forgetting and Relearning Curves





Army of Cold War



Army of Modular Brigade

ARFORGEN

Application to Individual, Team, and Unit Training
(Underlying theory of Combined Arms Training Strategy)

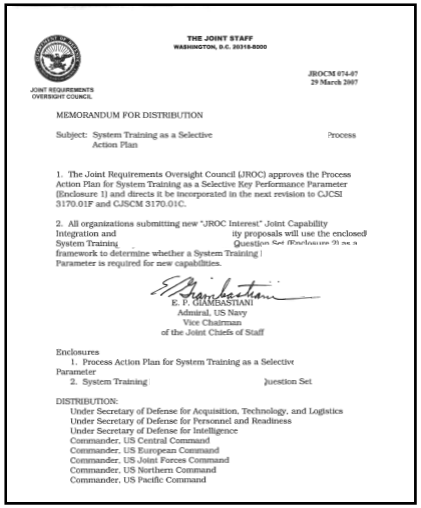
Blurring of Lines Between Training and Operations

- Navy is moving toward virtual simulation to certify proficiency and mission readiness.

- Battle Force Training Tool (BFTT):
  - Each unit is provided the scenario, using Wide Area Network (WAN).
  - Each unit joins a Synthetic Theater of War (STOW) at the gaming area.
    - Training accomplished in-port, but interacts as if underway in the STOW.
  - Scenarios may be transmitted from a land-based site.
  - Battle Force/Group Commanders participate.
- Allows participation from various unit types.
- Utilizes Wide Area Training Network that is independent of tactical data links.

The Army with the FCS Brigade Combat Team should eventually move to virtual simulation to certify proficiency and readiness.

System Training (ST) Question Set



THE JOINT STAFF
WASHINGTON, D.C. 20318-9000

JOINT REQUIREMENTS OVERSIGHT COUNCIL

JROCM 074-07
29 March 2007

MEMORANDUM FOR DISTRIBUTION

Subject: System Training as a Selective Process Action Plan

1. The Joint Requirements Oversight Council (JROC) approves the Process Action Plan for System Training as a Selective Key Performance Parameter (Enclosure 1) and directs it be incorporated in the next revision to CJCSI 3170.01F and CJSCM 3170.01C.

2. All organizations submitting new "JROC Interest" Joint Capability Integration and ity proposals will use the enclosed System Training Question Set (Enclosure 2) as a framework to determine whether a System Training ! Parameter is required for new capabilities.

E. P. GIAMBASTIANI
Admiral, US Navy
Vice Chairman
of the Joint Chiefs of Staff

Enclosures
1. Process Action Plan for System Training as a Selective Parameter
2. System Training uestion Set

DISTRIBUTION:
Under Secretary of Defense for Acquisition, Technology, and Logistics
Under Secretary of Defense for Personnel and Readiness
Under Secretary of Defense for Intelligence
Commander, US Central Command
Commander, US European Command
Commander, US Joint Forces Command
Commander, US Northern Command
Commander, US Pacific Command

- Availability
- Adaptability
- Realism
- Efficiency[1]

1. Is the system intended for Joint, multi-Service, reserve component, interagency, or coalition use?
2.Is the service life projected to be greater than five years, or extend beyond the initial warranty period, if applicable?
3. Is the program a designated acquisition special interest?
4. Is successful application of the system critically dependent on a rigorous training process early-on to maximize system capability with first unit equipped (FUE)?
5. Are total life cycle training costs projected to be a significant part of total life cycle costs?
6. Is a stand alone system training device part of the program?
7. Will there be "negative training" if early ST is not synchronized in the program?
8. Was the program designated a Joint Urgent Operational Need (JUON) or transitioning from a technology initiative like an ACTD or experiment?
9. Are there significant program inter-dependencies? (Note: "significant" is defined as three or more programs.)
10. Is the system (or cross system (meaning between systems)) operation or maintenance concept complex (specifically, the man-machine interface; **is a schoolhouse required)?**
1 1. Does the Commercial Off-The-Shelf (COTS) hardware or software integral to the program require an ST solution that is not part of the COTS product?
12. Is embedded training or embedded instrumentation feasible and appropriate? (Reference: DODD 1322.18 "Military Training" definition.)
13. Will realistic live training be restricted by cost, environmental, or safety, increasing the **reliance on virtual or constructive training capabilities**?

Readiness implications…..

How do you determine?

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OSD Operating & Support Cost Estimating[1]

- Current O&S Cost Models are not System of System estimates.

  "affordability assessments required at Milestone B and C." (p3-2)
  "Typically, one method to evaluate the O&S affordability is to compare the estimated O&S costs for the new system to the projected **O&S costs of the system** being replaced (if there is one)." (p.3-2)…compare IAW format in Appendix B.

- Army is no longer in Cold War – ARFORGEN applies – Cost for Deployed

  "Much of the CARD's – Cost Analysis Requirements Description – content will be used in O&S cost estimates." (p4-2)
  "The expectation is that the CARD should be sufficiently comprehensive in program definition to support a life cycle cost estimate." (p4-4)
  Areas in CARD impacted by FCS Embedded Training concept

  -- Risk areas associated with O&S or sustainment
  --- System Support Concept (System training concept)
  -- System activity rates
  -- System milestone schedule
  --- Facilities requirements
  --- Special support (unique infrastructure)

  Army presentation to OSD CAIG concerning O&S costs will include:

  -- O&S Cost Summary
  -- Estimating Methods for Major Cost Elements
  --- Sensitivity and/or Quantitative Risk Analysis
  --- **Time- Phased O&S Display (Home Station, Deployment, In Theater)**
  --- Annualized Steady-State Costs for Typical Unit
  ---Cost Track to Prior Estimate

- O&S Cost Estimating Process Must Accommodate Readiness Level Reqts.

OSD Operating & Support Cost Estimating Process

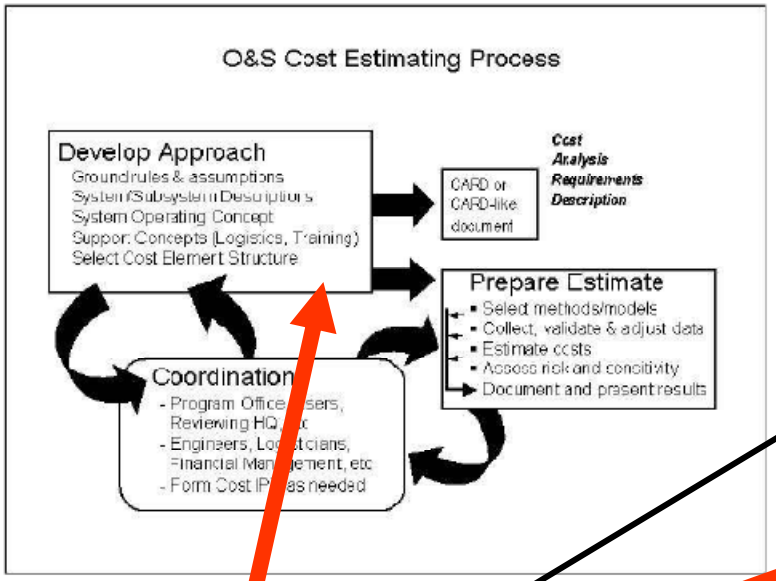

Figure 5-1. Recommended Analytic Approach for O&S Cost Estimates

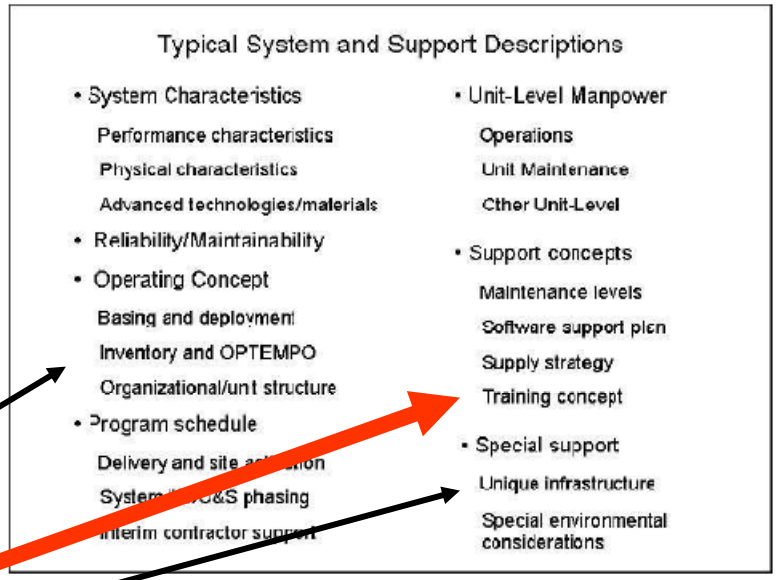

Figure 5.3. Typical Program and System Content

FCS Training IPT RDTE/Proc focused – Army must define ET O&S concept. Concern…CAIG methodology is for a "system"…Must compare with HBCT/SBCT for O&S…..

FCS is a "system of systems" and more like an **'aircraft carrier group'** than a **F-22**. O&S methodology must address ARFORGEN and persistent conflict requirement of 21st century.

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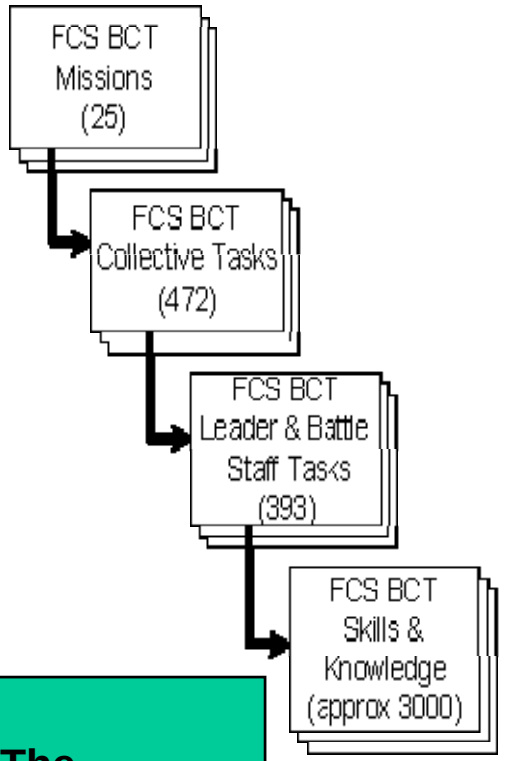
Availability Metrics

- *Measure Equipment Required for Training[1]. Combat Systems are measured for their readiness and availability. Key training systems will allow for proficiency and practice to ensure mission readiness need to be measured in like manner to the key combat and support platforms.*

  -- Available hours per soldier

- *Measure Individual Personnel Training Proficiency. Tag a Proficiency Level with date for key individual skills. Determine refresh rate.*
- *Measure Key Team Training Proficiency. Tag a Proficiency Level with date for an individual with skill proficiency. Determine a refresh rate.*
- *Measure UNIT Training Proficiency. Tag a Proficiency Level with a date and determine shelf life if "refresher" proficiency not obtained.*



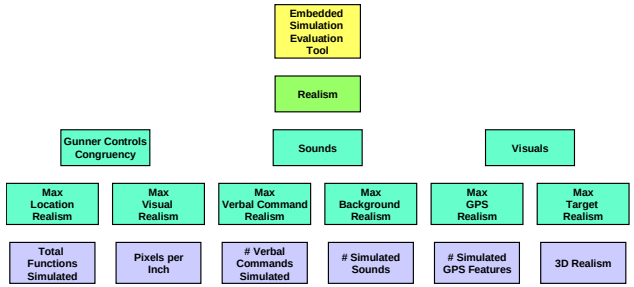
Availability of proficiency training must extend to 'operational environments' for skills which require timely 'refresher' training. The benefits of embedded training availability is significant in these 'operational environments'.

[1] **Decrease in relative availability of training facility resources.** Although ongoing modularity initiatives are expected to increase the number of BCTs by 30 percent, we see no commensurate increase in the number of maneuver ranges, simulation centers, CTC capacities and other training capabilities. Nor are increases in facilities and capacities being undertaken as a result of the increased requirements likely to be generated by BCTs' greater envisioned operational capabilities and concepts. As a key example, enhanced ISR and effects capabilities generate a need for a greater maneuver area for live training. RAND Study, "Assessing Options for Future Training Strategies for Brigade Combat Teams Equipped with FCS Technologies, MG538-A, Shawley, Crowley, Lewis, Masi, Leuschner, Straus, and Angers, 2006. Permission obtained from James Crowley.

Realism Metrics

Realism as a metric must measure the conditions of the training stimuli across several dimensions –

- ✓ **Task coverage – Does the training require the training audience to perform all the required tasks?**
- ✓ **Difficulty of the task – Does the training require the training audience to perform the required tasks at the level of difficulty as actual operations?**
- ✓ **Response Level – Does the training require the training audience to experience the same effects as in 'actual operations'?**



Suggestion – Develop a Five Level Training Realism Standard (Idea)

	Task Coverage	*Difficulty of Tasks*	*Response to Tasks*
Level 1 –	Individual	Crawl	Low
Level 2 –	Individual	Walk	High
Level 3 –	Team	Crawl	Low
Level 4 –	Team	Walk	High
Level 5 --	Unit	Run	High

Adaptability Metrics

Adaptability in training events is the potential to allow changes to a range of missions, enemies, conditions, and environments. Metrics to measure military training system adaptability should include at least the following three dimensions:

- Forces – Enemy Actors (Behaviors and Equipment)
- Forces - Friendly (Behaviors and Equipment)
- Environment – Terrain, Weather, Complexity of Operations

Each dimension should be quantified and used as a measure for comparison against competing training alternative.

Efficiency/Persistence Metrics

There should be a cost per training hour metric developed in conjunction with all ACAT 1/1A programs. The there should be comparison at all program milestones on embedded training versus all other feasible training strategies.

All Training O&S Costs

- *Software*
- *Hardware*
- *Infrastructure*
- *Unique Support Stuff (Ammo, etc.)*

Typical System and Support Descriptions

- System Characteristics
  - Performance characteristics
  - Physical characteristics
  - Advanced technologies/materials
- Reliability/Maintainability
- Operating Concept
  - Basing and deployment
  - Inventory and OPTEMPO
  - Organizational/unit structure
- Program schedule
  - Delivery and site activation
  - System life/O&S phasing
  - Interim contractor support
- Unit-Level Manpower
  - Operations
  - Unit Maintenance
  - Other Unit-Level
- Support concepts
  - Maintenance levels
  - Software support plan
  - Supply strategy
  - Training concept
- Special support
  - Unique infrastructure
  - Special environmental considerations

Figure 5.3. Typical Program and System Content

OPERATING AND SUPPORT
COST-ESTIMATING GUIDE

OFFICE OF THE SECRETARY OF DEFENSE
COST ANALYSIS IMPROVEMENT GROUP

OCTOBER 2007

Suggested Metrics for Training Evaluation

- **Availability Metrics –**

  Days/Hours/#Soldiers

- **Realism –**

  Scenarios/Terrain/Environment/Culture

- **Adaptability -**

  Can you change and how rapidly?

- **Efficient and Persistent -**

  What is overhead and will it be obsolete? Cost per hour/training?

Questions?

BACK UP

Events in Unit CATS

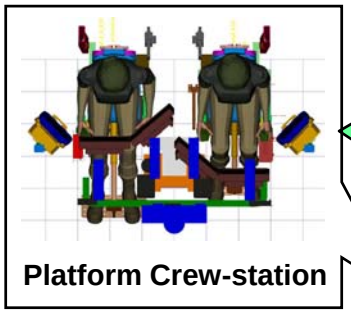
- Sergeant's Time Training (STT)
- Map Exercise (MAPEX)
- Situational Training Exercise (STX)
- Staff Training Exercise (STAFFEX)
- Logistical Exercise (LOGEX)
- Gunnery
- Fire Coordination Exercise (FCX)
- Field Training Exercise (FTX)
- Joint Training Exercise (JTX)
- Mobilization Exercise (MOBEX)
- Deployment Exercise (DEPEX)
- Tactical Exercise Without Troops (TEWT)
- Lanes Training Exercise (LTX)
- Command Post Exercise (CPX)
- Live Fire Exercise (LFX)
- Combined Arms Live Fire Ex (CALFEX)
- Command Field Exercise (CFX)
- Combined Training Exercise (CTX)
- Communications Exercise (COMEX)
- Team Training

ARFORGEN

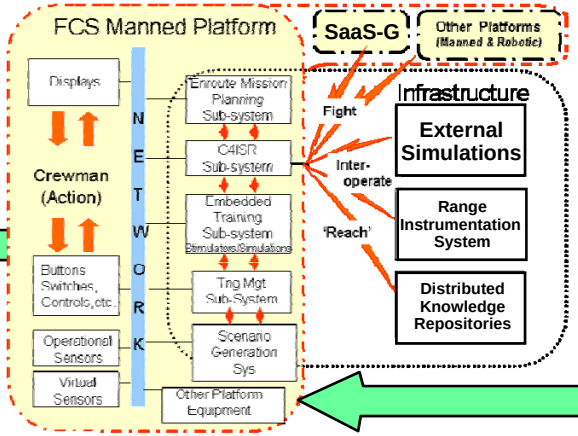
FCS Embedded Training Concept

CATS

Embedded Task Training
(Crews and Soldier)

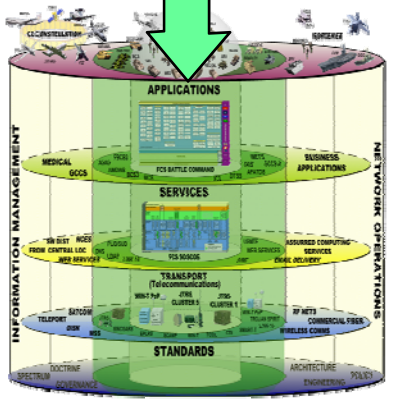


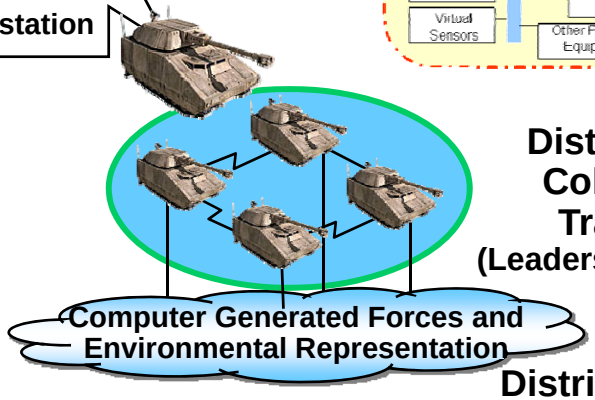
Platform Crew-station



Training Common Components

CGF	Environment Representation	Scenario Development	Exercise Management
LT-TES	Training Management	Data Logger	After Action Review (AAR)

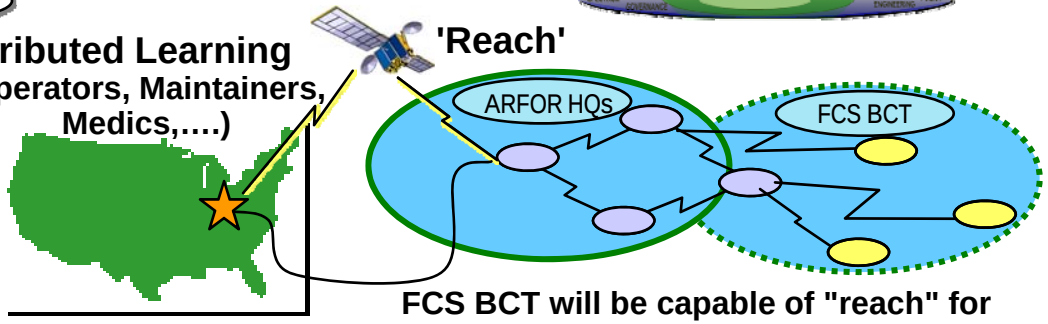




Distributed, Collective Training
(Leaders and Units)

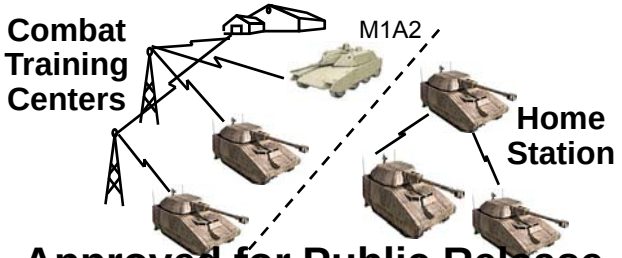
Computer Generated Forces and Environmental Representation

Distributed Learning
(Operators, Maintainers, Medics,....)



FCS BCT will be capable of "reach" for training products (e.g., TSPs).

Live Training
(Embedded Tactical Engagement Simulation System (TESS) and CTC Instrumentation Interface)



Embedded Training is User's requirement

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Key Performance Parameters & Training

- **Business Case for Training**
  - ✓ **Link to Readiness**
  - ✓ **Availability, Realism, Adaptability, and Efficiency**

- Joint Review of Major Acquisitions
- Readiness & Training Models
  - ✓ Metrics
  - ✓ Models – What do I get for my investment?

Functional Capability Boards

Command & Control Maj Gen Hostage JFCOM J-8	**Battlespace Awareness** Brig Gen (s) Grundhauser JS J-2	**Focused Logistics** MGen Usher JS J-4	**Force Management** Ms Disbrow JS J-8
Force Protection Maj Gen New JS J-8	**Force Application** Brig Gen Feest JS J-8	**Net-Centric** MG Moran JS J-6	**Joint Training** BG Bartell JS J-7

FCB Membership: (O-6 level)
Services
Combatant Command Reps
OSD (AT&L)
OSD (I)
USecAF (Space)

ASD NII/ DOD CIO
D, PA&E
DIA Rep (Threat)
Mission Rqmts Board Exec Sec'y (BA FCB)
Other DoD Agencies as necessary

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Disadvantages of Simulation (V-C) Training/Embedded Training

- **Realism of Stimuli – Effective training requires appropriate stimuli. Some training simulations inject unrealistic stimuli to the training audience. 'Work around' these issues often are distracters and may even interject "negative training". Timely updates to simulation-based training mitigates this disadvantage.**

- **Currency – Complex multi-threat multi-capable adversaries and tactics are difficult to keep current. The tactics of the adversary or environments may change faster than the databases that replicate them. Frequent updates to tactics and scenario databases mitigates this disadvantage.**

- **Combat Conditions Replicated – The stresses and challenges of combat affect the proficiency of soldiers. Simulations are not combat and the physiology impacts, challenges, and lack of sleep, food, shelter are not normally replicated in simulation-based training.**

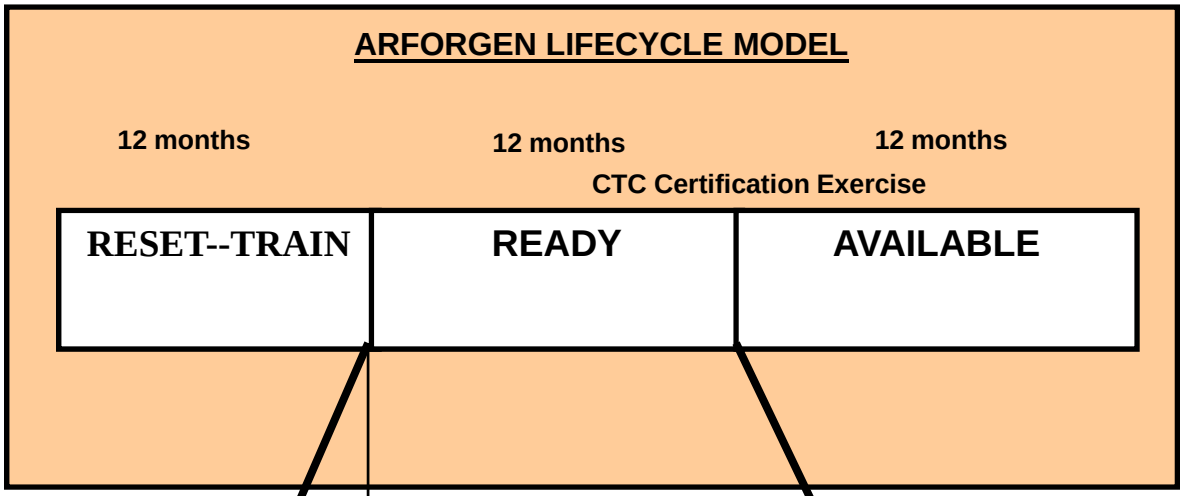
- **Computers Break and Software Crashes – Complex simulations are prone to casualties and delays occur that inhibit training. The same is true in other training venues (combat vehicles break or weapons fail) which cause delays in training.**

- **Multi-tasking of Training Audience – Simulation-based training has a tendency to be infringed by other garrison tasks by the training audience. Maintenance and other support personnel are often focused on repairs or other support functions. Inspections, other interruptions, and other meetings when training is scheduled must be made of lower priority and training events made the "main event".**

Advantages of Simulation (V-C) Training/Embedded Training

- Availability **– Simulation-based training can provide immediate feedback to the training audience not normally available in live training. The ability to re-immerse training audience in same scenario to apply lesson learned is directly attributable to availability.**
- Adaptability **– Simulated scenarios can be altered, stopped, or paused while a training exercise is in progress. These changes increase the training audience's skill level if applied appropriately to challenge team proficiency.**
- Efficiency**/Time Savings – The ability to reset, pause, and adjust a training scenario via simulations is often more time efficient than live training resets and pauses.**
- Flexibility **– Simulation-based training allows the training audience to receive the cues appropriate to their level of proficiency and progressively build higher proficiency. Adaptability and flexibility are symbiotic.**
- **Safety – High risk training events can be practiced safely prior to certification at a live range.**
- **Improves Soldier Quality of Life – Simulation-based training can be conducted at home station allowing soldiers not be in local training area or deployed for live training. Savings are accrued in Operations and Support dollars because of garrison training vs. "in the field" training.**
- **Repetition – Simulation-based training allows for repetition until proficiency is obtained or the team "get it right".**
- **Ability to Freeze – Simulation-based training is the only training that allows a "freeze" and "play back" of a training event. This is extremely important for ensuring safety procedures are followed and critical processes are followed.**
- **Environmentally Friendly – Simulation-based training normally has little negative impact on the environment.**
- **Soldier Friendly – Simulation-based training is less dangerous and allows soldiers to "spend more time at home".**
- Realism **of Environment – Simulation-based training can train in multiple conditions. The task and standard usually remain constant for proficiency but the impacts of different geography, weather, and other operational conditions have a decisive role in battle-focused training.**
- **Complexity – Complex multi-threat multi-capable organizations are difficult and expensive to create outside of simulation – based training. The ability to challenge the training audience with complex, multi-threat scenarios is a key advantage of simulated training versus conventional live training exercises.**

ARFORGEN Lifecycle Model



CATS

Back

R- Day – Begin core Mission Essential Task List (METL)

RESET--TRAIN

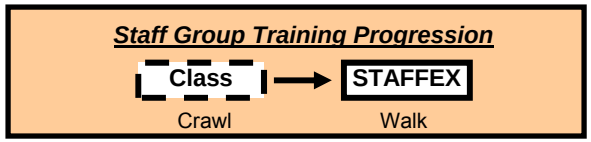
- Not ready for cbt opns
- Defense Spt to Homeland Security
- Equipment Reset/Recapitalization
- Institutional Trng Spt
- Change of Cmd/Property Accountability
- Receive and Stabilize New Personnel

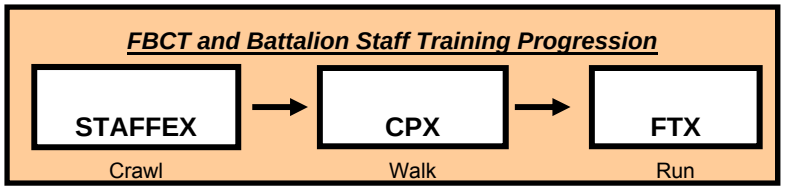
READY

- Ready for cbt opns after collective trng
- Focus is collective trng for core METL
- Equipment Ready/Surge Unit
- Institutional Trng Spt minimal
- Personnel team proficiency/competency
- Obtain and maintain capability levels

AVAILABLE

- Highest state of readiness/training
- Available for rapid deployment
- Focus on specific contingency/OPLAN
- Personnel team proficiency/competency
- Considered first for opns reqts





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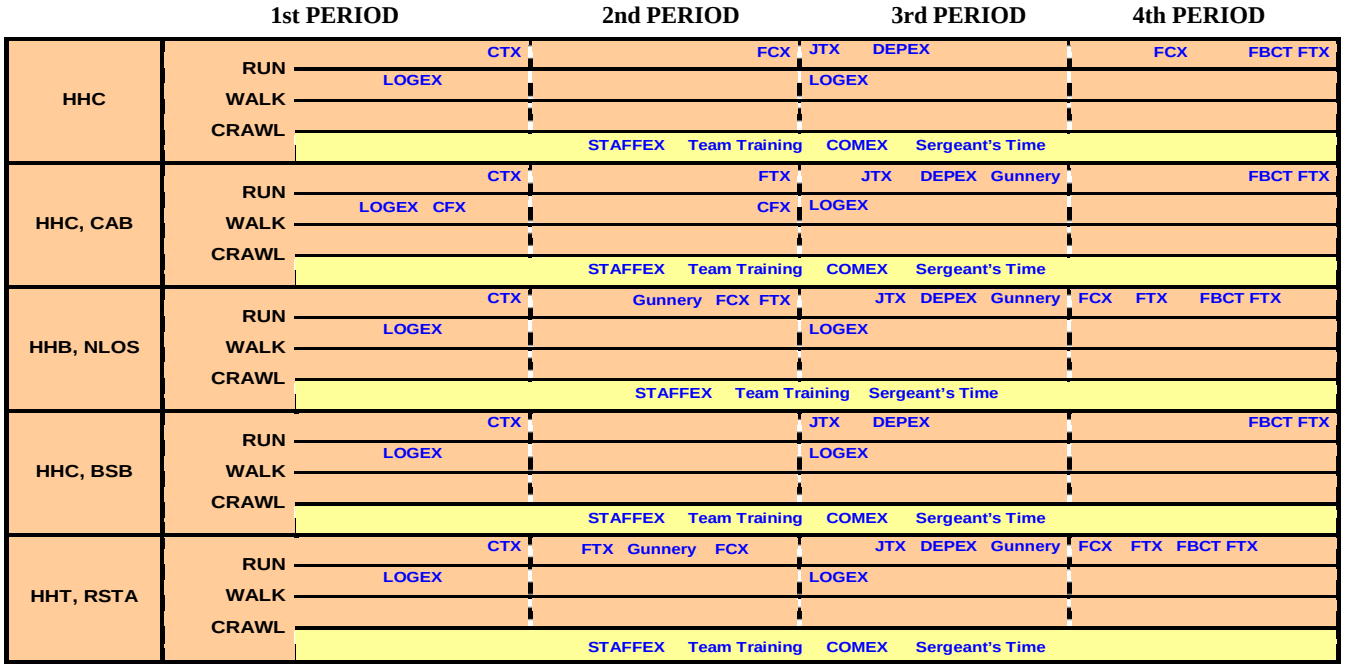
Training Environment in the FBCT during READY/AVAILABLE

"The mix of training environments (L-V-C) included in Future Force training strategies IS driven by embedded training capabilities and the different training needs of the various echelons." – Future Combat Systems Brigade Combat Team (FBCT) Unit CATS, 29 Nov 2006

FBCT TRAINING STRATEGY (Ready/Available Phase)



Example CATS for HQ Units in FBCT during Ready Force Pool

"Because of the much larger footprint of FBCTs and the embedded training capabilities resident in each system, it is anticipated that ***embedded training will rely heavily on simulation capabilities*** – especially virtual simulation for lower echelons and constructive simulation for battalions and above. Training at the FBCT level will require a mix or "hybrid" events that includes all three domains (L-V-C) for different echelons to take advantage of training areas that are much smaller than the tactical footprint of the FBCT. ***Live training will continue to be indispensable at company and below." FBCT CATS TAB D***

Back

Battle Staff Training

GENESIS: **Absence of universally understood battle staff training, equipping, and manning requirements have impaired the Army's understanding of battle command readiness.**

GUIDANCE: **The Army DCS G-3 issued a verbal directive to develop "Digital Gunnery" as a strategy to better prepare digitally enhanced battle staffs to conduct operations in a modular environment. There were two essential tasks identified in the directive:**

1. Treat the Battle Staff (Battalion to Corps level) as a weapons system.
2. Tie training to AR 350-1 and reporting to AR 220-1.

In response to that task, the CAC Commander and integrator of ABCS systems, directed the development of a "Digital Gunnery" concept which resulted a White Paper outlining the concept (which was approved by the Army G3 in April 2006) and an implementation plan which became the basis for an Army G3 OPORD on "Battle Command as a Weapons System" (BCAWS).

Functional Capability Boards

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OSD (AT&L)
OSD (I)
USecAF (Space)
ASD NII/ DOD CIO
D, PA&E
DIA Rep (Threat)
Mission Rqmts Board Exec Sec'y (BA FCB)
Other DoD Agencies as necessary

CMETL Definitions

General Mission Essential Tasks (GMETs):

Tasks that must be accomplished by all units, regardless of type,
in full spectrum operations in support of ARFORGEN, and approved by HQDA.

+

Core Capabilities Mission Essential Tasks (CCMETs):

Mission essential tasks that are specific to a type of unit, which is designed
and resourced according to its TO&E and doctrine, and approved by HQDA.

=

Core Mission Essential Task List (CMETL):

A list of the unit's tasks derived from a unit's capabilities which are based on the unit's TOE mission and doctrine. CMETL is comprised of tasks which the organization was designed to perform and general tasks applicable to all organizations, regardless of type.

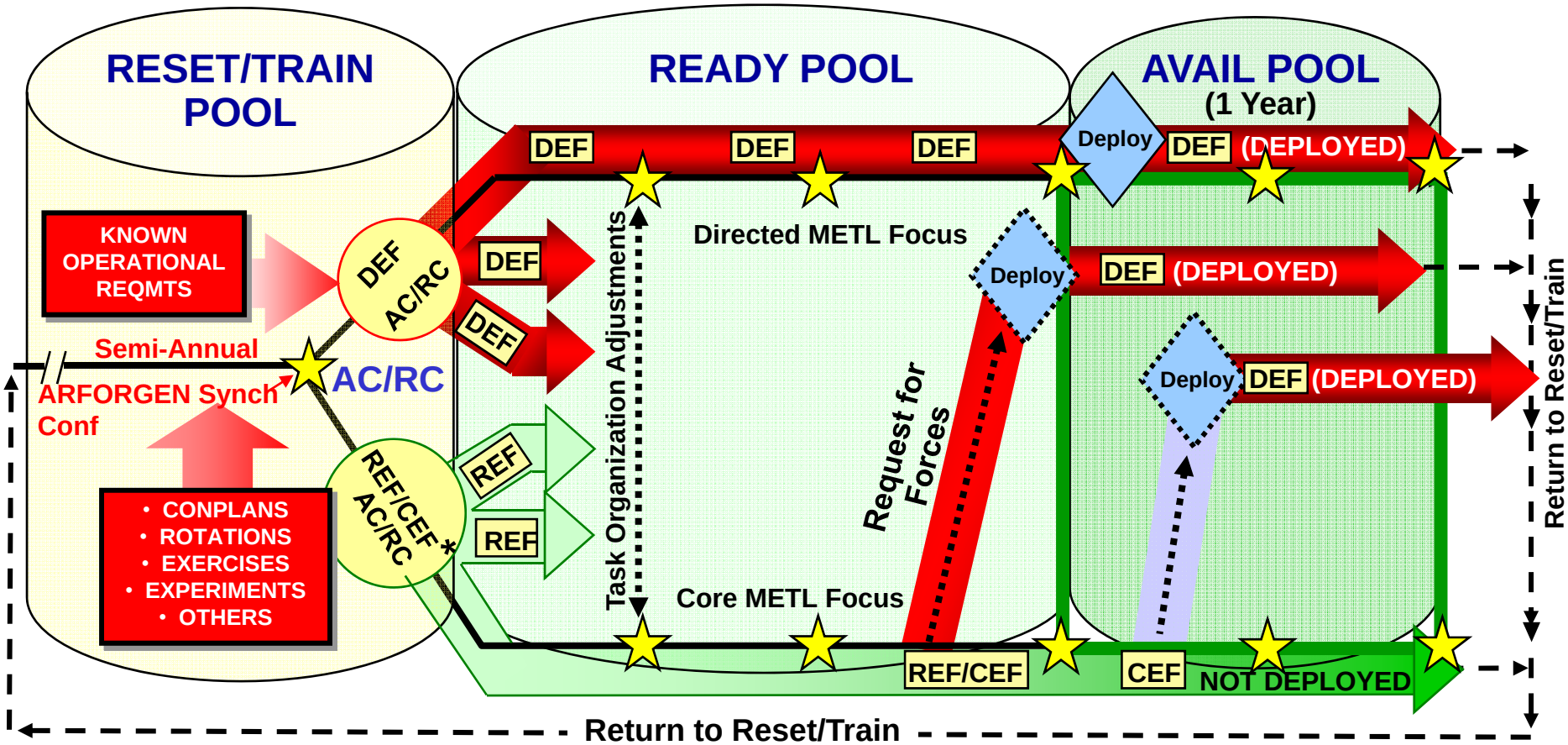
All unit CMETLs will contain General Mission Essential Tasks (GMETs) and
Core Capabilities Mission Essential Tasks (CCMETs).

Directed Mission Essential Task List (DMETL):

A list of the unit's tasks required to accomplish an assigned mission. When a unit is assigned a mission, the commander will develop a DMETL by adjusting the unit's CMETL, based upon mission analysis. Once established, the DMETL forms the new foundation and focus for unit training until completion of the assigned mission.

ARFORGEN (AC & RC) – Capabilities Based Requirements Driven Construct

Back



DEF: Deployment Expeditionary Force: Task organized units designed to execute named or numbered operational requirements and those currently executing deployed missions to include homeland defense or homeland security. (Note: RC units in a DEF have been sourced against a future requirement, alerted for mob, or are currently mobilized).

REF: Rapid Expeditionary Force: Task organized units designed to execute full spectrum training and prepare for potential contingency operational requirements.

CEF: Contingency Expeditionary Force: Units remaining in the Available Force Pool (not in a DEF) task organized to meet operational plans and contingency requirements.